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PN - JP6275436 A 19940930
 TI - STACKED-TYPE NOISE FILTER
 FI - H01F15/00&D ; H01G4/30&301A ; H01G4/30&301D ; H01G4/40&321 ; H03H7/075&A
 PA - MURATA MANUFACTURING CO
 IN - WAKINO KIKUO
 AP - JP19930059247 19930319
 PR - JP19930059247 19930319
 DT - I

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AN - 1994-352421 [44]
 TI - Laminated noise wave filter for electronic device - includes insulating layers and main electrical contact on surface, with penetration electric conductors connected to insulation layer NoAbstract
 AB - J06275436
 - (Dwg.1/8)
 IW - LAMINATE NOISE WAVE FILTER ELECTRONIC DEVICE INSULATE LAYER MAIN ELECTRIC CONTACT SURFACE PENETRATE ELECTRIC CONDUCTOR CONNECT INSULATE LAYER NOABSTRACT
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PN - JP6275436 A 19940930
 TI - STACKED-TYPE NOISE FILTER
 AB - PURPOSE:To obtain a stacked-type noise filter which provides large inductance without decreasing capacitance.
 - CONSTITUTION:The structure of a stacked-type noise filter 1 is that insulating sheets 2, 4, 6 which have through conductors 10, 11 12 on the surface and insulating sheets 3, 5 having ground conductors 13, 14 on the surface are stacked alternately. The through conductors 10-12 are connected in series due to through holes 18a, 18b 19a, 19b made in the insulating sheets 2-5. These through conductors 10-12 have inductance and have capacitance between the ground conductors 13 and 14.
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PATENT ABSTRACTS OF JAPAN

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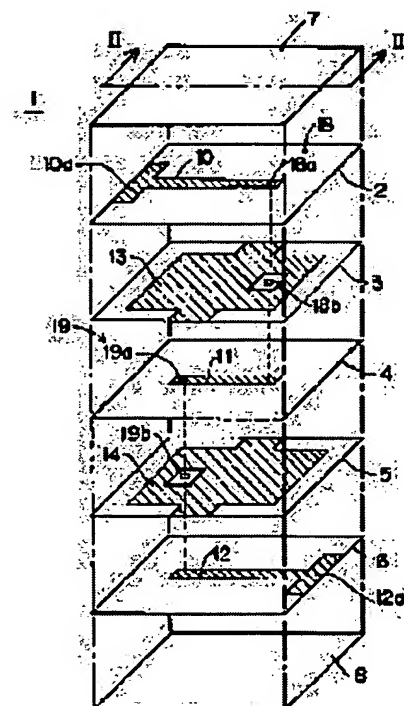
(72)Inventor : WAKINO KIKUO

(54) STACKED-TYPE NOISE FILTER

(57)Abstract:

PURPOSE: To obtain a stacked-type noise filter which provides large inductance without decreasing capacitance.

CONSTITUTION: The structure of a stacked-type noise filter 1 is that insulating sheets 2, 4, 6 which have through conductors 10, 11 12 on the surface and insulating sheets 3, 5 having ground conductors 13, 14 on the surface are stacked alternately. The through conductors 10-12 are connected in series due to through holes 18a, 18b 19a, 19b made in the insulating sheets 2-5. These through conductors 10-12 have inductance and have capacitance between the ground conductors 13 and 14.



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CLAIMS

[Claim(s)]

[Claim 1] penetration -- the insulating layer which prepared the conductor in the front face, and a gland -- the insulating layer which prepared the conductor in the front face -- alternation -- a laminating -- carrying out -- said penetration -- a conductor -- the laminating mold noise filter characterized by connecting mutual to a serial with the interlayer connection means formed in said insulating layer.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the laminating mold noise filter for removing the noise which invades into electronic equipment etc.

[0002]

[Description of the Prior Art] As a conventional laminating mold noise filter, the noise filter 71 shown in drawing 8 is known. this noise filter 71 -- a gland -- a conductor 78 and penetration -- a conductor 79 and a gland -- the laminating of the insulating sheets 72, 73, and 74 which formed the conductor 80 in the front face, respectively, and the protection sheets 76 and 77 with which these insulating sheets 72-74 were arranged up and down is carried out in one. penetration -- while a conductor 79 has an inductance -- a gland -- it has capacitance between conductors 80. the case where he wants to increase an inductance in this noise filter 71 without changing components size -- penetration -- it is necessary to make the conductor width of a conductor 79 thin

[0003] however, penetration -- if the conductor width of a conductor 79 is made thin -- a gland -- the capacitance which it has between conductors 80 decreases, and the problem that a desired electrical property is not acquired arises. Then, the technical problem of this invention is to offer the laminating mold noise filter with which a big inductance is obtained, without decreasing capacitance.

[0004]

[The means and operation] for solving a problem the laminating mold noise filter applied to this invention in order to solve the above technical problem -- penetration -- the insulating layer which prepared the conductor in the front face, and a gland -- the insulating layer which prepared the conductor in the front face -- alternation -- a laminating -- carrying out -- said penetration -- a conductor -- it is characterized by connecting mutual to a serial with the interlayer connection means formed in said insulating layer. As an interlayer connection means, the through hole established in the insulating layer is adopted.

[0005] the above configuration -- setting -- each penetration -- between conductors -- a gland -- since a conductor is arranged -- this noise filter -- penetration -- a conductor -- while having an own inductance -- penetration -- a conductor and a gland -- it has capacitance between conductors. and each penetration -- since a conductor is connected to a serial by the interlayer connection means formed in the insulating layer -- penetration -- the conductor of a conductor -- merit becomes longer than the conventional noise filter, and an inductance becomes larger than the conventional noise filter. moreover, penetration -- the conductor of a conductor -- merit -- long -- writing -- a gland -- an opposed face product with a conductor increases and, thereby, capacitance increases. in order [therefore,] to enlarge an inductance -- penetration -- even if it makes the conductor width of a conductor thinner than the conventional noise filter -- a conductor -- the amount of [which increases merit to writing for a long time] capacitance compensates a part for the capacitance which decreases to write a conductor width thinly.

[0006]

[Example] Hereafter, the example of the laminating mold noise filter concerning this invention is explained with reference to an accompanying drawing.

it is shown in [1st example, drawing 1 - drawing 3] drawing 1 -- as -- the laminating mold noise filter 1 -- penetration - the insulating sheets 2, 4, and 6 which formed conductors 10, 11, and 12 in the front face, respectively, and a gland -- it is having structure which accumulated by turns the insulating sheets 3 and 5 which formed conductors 13 and 14 in

the front face, respectively. As an ingredient of the insulating sheets 2-6, you may be any of dielectric materials or a magnetic-substance ingredient, and may be such combination.

[0007] the penetration prepared in the insulating sheet 2 -- a conductor 10 is a straight-line configuration, one edge 10a is exposed to the edge on the left-hand side of the insulating sheet 2, and through hole 18a is prepared in the other-end section. the gland established in the insulating sheet 3 -- a conductor 13 has the shape of an abbreviation rectangle of extensive area, and the part has exposed it to the near side of the insulating sheet 3, and the edge by the side of the back. furthermore, through hole 18b prepares in that conservative location at the insulating sheet 3 -- having -- **** -- a gland -- a conductor 13 leaves the perimeter section of this through hole 18b, and is prepared. in addition, the penetration which this through hole 18b mentions later -- it is for connecting conductors 10 and 11 electrically, and in order to raise the dependability of that connection, it is desirable to form a conductor in a through hole 18b periphery or the interior (the same is said of the through hole of each below-mentioned example hereafter).

[0008] the penetration prepared in the insulating sheet 4 -- a conductor 11 is a straight-line configuration and through hole 19a is prepared in one edge. the gland established in the insulating sheet 5 -- a conductor 14 has the shape of a rectangle of extensive area, and the part has exposed it to the near side of the insulating sheet 5, and the edge by the side of the back. furthermore, through hole 19b prepares in that left-leaning location at the insulating sheet 5 -- having -- **** -- a gland -- a conductor 14 leaves the perimeter section of this through hole 19b, and is prepared.

[0009] the penetration prepared in the insulating sheet 6 -- a conductor 12 is a straight-line configuration and one edge 12a has exposed it to the edge on the right-hand side of the insulating sheet 6. The protection sheets 7 and 8 are arranged in the upper and lower sides of each insulating sheets 2-6. The noise filter 1 of the structure shown in drawing 2 is obtained by accumulating these sheets 2-8 and calcinating them in one. The I/O electrodes 25 and 26 are formed in the both ends of a noise filter 1, and the grand electrode 27 is formed in the center section. penetration -- one edge 10a of a conductor 10 is electrically connected to the I/O electrode 25. penetration -- one edge 12a of a conductor 12 is electrically connected to the I/O electrode 26. a gland -- conductors 13 and 14 are electrically connected to the grand electrode 27.

[0010] the condition that the laminating of each sheets 2-8 was carried out -- penetration -- it connects with a serial through through holes 18 (18a, 18b) and 19 (19a, 19b), and conductors 10, 11, and 12 form the coil (refer to drawing 3) of an inductance L. furthermore, penetration -- penetration between conductors 10 and 11 -- between conductors 11 and 12 -- respectively -- a gland -- since conductors 13 and 14 are arranged -- penetration -- conductors 10-12 and a gland -- the capacitor (refer to drawing 3) of capacitance C is formed among conductors 13 and 14. Drawing 3 is the electric representative circuit schematic of a noise filter 1.

[0011] the noise filter 1 which consists of the above structure -- penetration -- since conductors 10-12 are connected to the serial by through holes 18 and 19 -- penetration -- the conductor of a conductor -- merit becomes longer than the conventional noise filter, and the big inductance L is obtained. moreover, penetration -- the conductor of conductors 10-12 -- merit -- long -- writing -- a gland -- an opposed face product with conductors 13 and 14 increases, and, thereby, capacitance increases. in order [therefore,] to enlarge the inductance L of a noise filter 1 -- penetration -- even if it makes the conductor width of conductors 10-12 thinner than the conventional noise filter -- a conductor -- the amount of [which increases merit to writing for a long time] capacitance compensates a part for the capacitance which decreases to write a conductor width thinly.

[0012] The 2nd example of [the 2nd example, drawing 4 - drawing 6] explains a noise filter equipped with four noise filter components array type. it is shown in drawing 4 -- as -- a noise filter 31 -- penetration -- the insulating sheets 32, 34, and 36 which formed conductors 40 (401,402,403,404), 41 (411,412,413,414), and 42 (421,422,423,424) in the front face, respectively, and a gland -- it is having structure which accumulated by turns the insulating sheets 33 and 35 which formed conductors 43 and 44 in the front face, respectively.

[0013] the penetration prepared in the insulating sheet 32 -- one edge of a conductor 40 is exposed to the edge by the side of the back of the insulating sheet 32, and the through hole 45 (451, 452, 453, 454) is established in the other-end section. the gland established in the insulating sheet 33 -- the part has exposed the conductor 43 to the edge of right and left of the insulating sheet 33. furthermore, a through hole 46 (461,462,463,464) prepares in the location of that near side at the insulating sheet 33 -- having -- **** -- a gland -- a conductor 43 leaves the perimeter section of this through hole 46, and is prepared.

[0014] the penetration prepared in the insulating sheet 34 -- the through hole 47 (471,472,473,474) is established in one edge of a conductor 41 (411,412,413,414). the gland established in the insulating sheet 35 -- the part has exposed the

conductor 44 to the edge of right and left of the insulating sheet 35. furthermore, a through hole 48 (481,482,483,484) prepares in the location by the side of that back at the insulating sheet 35 -- having -- **** -- a gland -- a conductor 44 leaves the perimeter section of this through hole 48, and is prepared.

[0015] the penetration prepared in the insulating sheet 36 -- one edge of a conductor 42 (421,422,423,424) is exposed to the edge of the near side of the insulating sheet 36. The protection sheets 37 and 38 are arranged in the upper and lower sides of each insulating sheets 32-36. These sheets 32-38 are accumulated, and it calcinates in one, and considers as the laminating mold noise filter 31. Next, as shown in drawing 5, the I/O electrodes 53 (531,532,533,534) and 54 (541,542,543,544) are formed in the near side of a noise filter 31, and the lateral portion by the side of the back, and the grand electrodes 55a and 55b are formed in both ends. penetration -- conductors 40 and 42 -- the I/O electrodes 54 and 53 -- electric -- connecting -- a gland -- conductors 43 and 44 are electrically connected to the grand electrodes 55a and 55b. the condition that the laminating of each sheets 32-38 was carried out -- penetration -- it connects with a serial through through holes 45, 46, 47, and 48, and conductors 40, 41, and 42 form the coil (refer to drawing 6) of an inductance L. furthermore, penetration -- penetration between conductors 40 and 41 -- between conductors 41 and 42 -- respectively -- a gland -- since conductors 43 and 44 are arranged -- penetration -- conductors 40-42 and a gland -- the capacitor (refer to drawing 6) of capacitance C is formed among conductors 43 and 44. Drawing 6 is the electric representative circuit schematic of a noise filter 31.

[0016] The noise filter 31 which consists of the above structure does so the same operation as the noise filter 1 of said 1st example, and effectiveness. Therefore, the noise filter 31 of the array type with which a big inductance is obtained is obtained, without decreasing capacitance.

the laminating mold noise filter concerning example] this invention besides [is not limited to said example, within the limits of the summary, can be boiled variously and can deform.

[0017] penetration -- the straight-line configuration penetration which the conductor did not need to be a straight-line configuration, for example, was shown in drawing 1 in order to obtain a bigger inductance -- the spiral shape-like penetration shown in drawing 7 instead of a conductor 10 -- a conductor 59 may be adopted. In addition, 60 is a through hole. Moreover, this laminating mold noise filter can also be used as signal delay components as it is.

[0018] Moreover, although said example explained the noise filter having a coil and a capacitor, it may be the noise filter which also contained the resistor further in addition to this. Furthermore, although said example is calcinated in one after it accumulates the insulating sheet with which the conductor was formed, respectively, it is not necessarily limited to this. For example, a noise filter may be produced by the process explained below. After applying a paste-like insulator ingredient, drying with means, such as printing, and forming an insulating layer, a paste-like conductor ingredient is applied to the front face of the insulating layer, it dries on it, and the conductor of arbitration is formed in it. Furthermore, it applies and dries from said conductor and let a paste-like insulator ingredient be an insulating layer. In this way, the noise filter which has a laminated structure is obtained by giving two coats in order.

[0019]

[Effect of the Invention] according to [so that clearly / in the above explanation] this invention -- each penetration -- since the conductor was connected to the serial with the interlayer connection means -- penetration -- the conductor of a conductor -- merit becomes longer than the conventional noise filter, and a big inductance is obtained. moreover, each penetration -- between conductors -- a gland -- since the conductor was arranged -- penetration -- the conductor of a conductor -- if merit is lengthened -- a gland -- an opposed face product with a conductor becomes large, and capacitance increases. in order [therefore,] to enlarge the inductance of a noise filter -- penetration -- a part for the capacitance which decreases to write a conductor width thinly even if it makes the conductor width of a conductor thin -- penetration -- the conductor of a conductor -- it can compensate by part for the capacitance which increased by lengthening merit.

[0020] Consequently, without decreasing capacitance, an inductance can be enlarged and the good laminating mold noise filter of an electrical property is obtained.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the laminating mold noise filter for removing the noise which invades into electronic equipment etc.

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EFFECT OF THE INVENTION

[Effect of the Invention] according to [so that clearly / in the above explanation] this invention -- each penetration -- since the conductor was connected to the serial with the interlayer connection means -- penetration -- the conductor of a conductor -- merit becomes longer than the conventional noise filter, and a big inductance is obtained. moreover, each penetration -- between conductors -- a gland -- since the conductor was arranged -- penetration -- the conductor of a conductor -- if merit is lengthened -- a gland -- an opposed face product with a conductor becomes large, and capacitance increases. in order [therefore,] to enlarge the inductance of a noise filter -- penetration -- a part for the capacitance which decreases to write a conductor width thinly even if it makes the conductor width of a conductor thin -- penetration -- the conductor of a conductor -- it can compensate by part for the capacitance which increased by lengthening merit.

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TECHNICAL PROBLEM

[Description of the Prior Art] As a conventional laminating mold noise filter, the noise filter 71 shown in drawing 8 is known. this noise filter 71 -- a gland -- a conductor 78 and penetration -- a conductor 79 and a gland -- the laminating of the insulating sheets 72, 73, and 74 which formed the conductor 80 in the front face, respectively, and the protection sheets 76 and 77 with which these insulating sheets 72-74 were arranged up and down is carried out in one. penetration -- while a conductor 79 has an inductance -- a gland -- it has capacitance between conductors 80. the case where he wants to increase an inductance in this noise filter 71 without changing components size -- penetration -- it is necessary to make the conductor width of a conductor 79 thin

[0003] however, penetration -- if the conductor width of a conductor 79 is made thin -- a gland -- the capacitance which it has between conductors 80 decreases, and the problem that a desired electrical property is not acquired arises. Then, the technical problem of this invention is to offer the laminating mold noise filter with which a big inductance is obtained, without decreasing capacitance.

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 OPERATION

[The means and operation] for solving a problem the laminating mold noise filter applied to this invention in order to solve the above technical problem -- penetration -- the insulating layer which prepared the conductor in the front face, and a gland -- the insulating layer which prepared the conductor in the front face -- alternation -- a laminating -- carrying out -- said penetration -- a conductor -- it is characterized by connecting mutual to a serial with the interlayer connection means formed in said insulating layer. As an interlayer connection means, the through hole established in the insulating layer is adopted.

[0005] the above configuration -- setting -- each penetration -- between conductors -- a gland -- since a conductor is arranged -- this noise filter -- penetration -- a conductor -- while having an own inductance -- penetration -- a conductor and a gland -- it has capacitance between conductors. and each penetration -- since a conductor is connected to a serial by the interlayer connection means formed in the insulating layer -- penetration -- the conductor of a conductor -- merit becomes longer than the conventional noise filter, and an inductance becomes larger than the conventional noise filter. moreover, penetration -- the conductor of a conductor -- merit -- long -- writing -- a gland -- an opposed face product with a conductor increases and, thereby, capacitance increases. in order [therefore,] to enlarge an inductance -- penetration -- even if it makes the conductor width of a conductor thinner than the conventional noise filter -- a conductor -- the amount of [which increases merit to writing for a long time] capacitance compensates a part for the capacitance which decreases to write a conductor width thinly.

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EXAMPLE

[Example] Hereafter, the example of the laminating mold noise filter concerning this invention is explained with reference to an accompanying drawing.

it is shown in [1st example, drawing 1 - drawing 3] drawing 1 -- as -- the laminating mold noise filter 1 -- penetration - the insulating sheets 2, 4, and 6 which formed conductors 10, 11, and 12 in the front face, respectively, and a gland -- it is having structure which accumulated by turns the insulating sheets 3 and 5 which formed conductors 13 and 14 in the front face, respectively. As an ingredient of the insulating sheets 2-6, you may be any of dielectric materials or a magnetic-substance ingredient, and may be such combination.

[0007] the penetration prepared in the insulating sheet 2 -- a conductor 10 is a straight-line configuration, one edge 10a is exposed to the edge on the left-hand side of the insulating sheet 2, and through hole 18a is prepared in the other-end section. the gland established in the insulating sheet 3 -- a conductor 13 has the shape of an abbreviation rectangle of extensive area, and the part has exposed it to the near side of the insulating sheet 3, and the edge by the side of the back. furthermore, through hole 18b prepares in that conservative location at the insulating sheet 3 -- having -- **** -- a gland -- a conductor 13 leaves the perimeter section of this through hole 18b, and is prepared. in addition, the penetration which this through hole 18b mentions later -- it is for connecting conductors 10 and 11 electrically, and in order to raise the dependability of that connection, it is desirable to form a conductor in a through hole 18b periphery or the interior (the same is said of the through hole of each below-mentioned example hereafter).

[0008] the penetration prepared in the insulating sheet 4 -- a conductor 11 is a straight-line configuration and through hole 19a is prepared in one edge. the gland established in the insulating sheet 5 -- a conductor 14 has the shape of a rectangle of extensive area, and the part has exposed it to the near side of the insulating sheet 5, and the edge by the side of the back. furthermore, through hole 19b prepares in that left-leaning location at the insulating sheet 5 -- having - **** -- a gland -- a conductor 14 leaves the perimeter section of this through hole 19b, and is prepared.

[0009] the penetration prepared in the insulating sheet 6 -- a conductor 12 is a straight-line configuration and one edge 12a has exposed it to the edge on the right-hand side of the insulating sheet 6. The protection sheets 7 and 8 are arranged in the upper and lower sides of each insulating sheets 2-6. The noise filter 1 of the structure shown in drawing 2 is obtained by accumulating these sheets 2-8 and calcinating them in one. The I/O electrodes 25 and 26 are formed in the both ends of a noise filter 1, and the grand electrode 27 is formed in the center section. penetration -- one edge 10a of a conductor 10 is electrically connected to the I/O electrode 25. penetration -- one edge 12a of a conductor 12 is electrically connected to the I/O electrode 26. a gland -- conductors 13 and 14 are electrically connected to the grand electrode 27.

[0010] the condition that the laminating of each sheets 2-8 was carried out -- penetration -- it connects with a serial through through holes 18 (18a, 18b) and 19 (19a, 19b), and conductors 10, 11, and 12 form the coil (refer to drawing 3) of an inductance L. furthermore, penetration -- penetration between conductors 10 and 11 -- between conductors 11 and 12 -- respectively -- a gland -- since conductors 13 and 14 are arranged -- penetration -- conductors 10-12 and a gland -- the capacitor (refer to drawing 3) of capacitance C is formed among conductors 13 and 14. Drawing 3 is the electric representative circuit schematic of a noise filter 1.

[0011] the noise filter 1 which consists of the above structure -- penetration -- since conductors 10-12 are connected to the serial by through holes 18 and 19 -- penetration -- the conductor of a conductor -- merit becomes longer than the conventional noise filter, and the big inductance L is obtained. moreover, penetration -- the conductor of conductors 10-12 -- merit -- long -- writing -- a gland -- an opposed face product with conductors 13 and 14 increases, and, thereby,

capacitance increases. in order [therefore,] to enlarge the inductance L of a noise filter 1 -- penetration -- even if it makes the conductor width of conductors 10-12 thinner than the conventional noise filter -- a conductor -- the amount of [which increases merit to writing for a long time] capacitance compensates a part for the capacitance which decreases to write a conductor width thinly.

[0012] The 2nd example of [the 2nd example, drawing 4 - drawing 6] explains a noise filter equipped with four noise filter components array type. it is shown in drawing 4 -- as -- a noise filter 31 -- penetration -- the insulating sheets 32, 34, and 36 which formed conductors 40 (401,402,403,404), 41 (411,412,413,414), and 42 (421,422,423,424) in the front face, respectively, and a gland -- it is having structure which accumulated by turns the insulating sheets 33 and 35 which formed conductors 43 and 44 in the front face, respectively.

[0013] the penetration prepared in the insulating sheet 32 -- one edge of a conductor 40 is exposed to the edge by the side of the back of the insulating sheet 32, and the through hole 45 (451, 452, 453, 454) is established in the other-end section. the gland established in the insulating sheet 33 -- the part has exposed the conductor 43 to the edge of right and left of the insulating sheet 33. furthermore, a through hole 46 (461,462,463,464) prepares in the location of that near side at the insulating sheet 33 -- having -- **** -- a gland -- a conductor 43 leaves the perimeter section of this through hole 46, and is prepared.

[0014] the penetration prepared in the insulating sheet 34 -- the through hole 47 (471,472,473,474) is established in one edge of a conductor 41 (411,412,413,414). the gland established in the insulating sheet 35 -- the part has exposed the conductor 44 to the edge of right and left of the insulating sheet 35. furthermore, a through hole 48 (481,482,483,484) prepares in the location by the side of that back at the insulating sheet 35 -- having -- **** -- a gland -- a conductor 44 leaves the perimeter section of this through hole 48, and is prepared.

[0015] the penetration prepared in the insulating sheet 36 -- one edge of a conductor 42 (421,422,423,424) is exposed to the edge of the near side of the insulating sheet 36. The protection sheets 37 and 38 are arranged in the upper and lower sides of each insulating sheets 32-36. These sheets 32-38 are accumulated, and it calcinates in one, and considers as the laminating mold noise filter 31. Next, as shown in drawing 5 , the I/O electrodes 53 (531,532,533,534) and 54 (541,542,543,544) are formed in the near side of a noise filter 31, and the lateral portion by the side of the back, and the grand electrodes 55a and 55b are formed in both ends. penetration -- conductors 40 and 42 -- the I/O electrodes 54 and 53 -- electric -- connecting -- a gland -- conductors 43 and 44 are electrically connected to the grand electrodes 55a and 55b. the condition that the laminating of each sheets 32-38 was carried out -- penetration -- it connects with a serial through through holes 45, 46, 47, and 48, and conductors 40, 41, and 42 form the coil (refer to drawing 6) of an inductance L. furthermore, penetration -- penetration between conductors 40 and 41 -- between conductors 41 and 42 -- respectively -- a gland -- since conductors 43 and 44 are arranged -- penetration -- conductors 40-42 and a gland -- the capacitor (refer to drawing 6) of capacitance C is formed among conductors 43 and 44. Drawing 6 is the electric representative circuit schematic of a noise filter 31.

[0016] The noise filter 31 which consists of the above structure does so the same operation as the noise filter 1 of said 1st example, and effectiveness. Therefore, the noise filter 31 of the array type with which a big inductance is obtained is obtained, without decreasing capacitance.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The assembly perspective view showing the 1st example of the laminating mold noise filter concerning this invention.

[Drawing 2] The II-II' sectional view of the laminating mold noise filter shown in drawing 1 .

[Drawing 3] The electric representative circuit schematic of the laminating mold noise filter shown in drawing 1 .

[Drawing 4] The assembly perspective view showing the 2nd example of the laminating mold noise filter concerning this invention.

[Drawing 5] The perspective view showing the appearance of the laminating mold noise filter shown in drawing 4 .

[Drawing 6] The electric representative circuit schematic of the laminating mold noise filter shown in drawing 4 .

[Drawing 7] The perspective view of the insulating sheet used for other examples of the laminating mold noise filter concerning this invention.

[Drawing 8] The assembly perspective view showing the conventional example.

[Description of Notations]

1 -- Laminating mold noise filter

2, 3, 4, 5, 6 -- Insulating sheet

10, 11, and 12 -- penetration -- a conductor

13 and 14 -- gland -- a conductor

18 19 -- Through hole

31 -- Array type laminating mold noise filter

32, 33, 34, 35, 36 -- Insulating sheet

40, 41, and 42 -- penetration -- a conductor

43 and 44 -- gland -- a conductor

45, 46, 47, 48 -- Through hole

[Translation done.]